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10/826,025	04/15/2004	Charles Jianping Zhou	SUN04-0051	9083

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EXAMINER
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INGBERG, TODD D

ART UNIT	PAPER NUMBER
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2193

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/826,025	<b>Applicant(s)</b> ZHOU ET AL.	
	<b>Examiner</b> Todd Ingberg	<b>Art Unit</b> 2193	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

### DETAILED ACTION

Claims 1 – 31 have been examined.

#### *Drawings*

1. The drawings filed April 15, 2004 have been accepted.

#### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2 and 19 – 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitations “*completely*” and “*effectively*” are not clear and concise. How to understand when these limitations have been met is unclear.

#### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 6 – 16, 18, 20, 23 – 24 and 30 - 31 are rejected under 35 U.S.C. 102(b) as being anticipated by #USPN 5,892,947 DeLong et al. (**De**).

#### **Claim 1**

DeLong (De, Col 2 line 25 to col 6, line 37, Col 6, line 58 to Col 7 line, 54 and col 8, line 62 to col 9, line 15 and col 9, line 37 – line 50) anticipates a computer-implemented method of mapping software components to test cases that test the software components (De, Figure 10, #200 ), the method comprising: for each component in a set of software components (De,

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Figure 7, ##101, 105, 103, 104 and 106) , generating a corresponding component node in a bipartite graph (De, Figure 10, #201, Build Graph); for each test case in a set of test cases configured to test the software components (De, Figure 10, #202 – 203 – Decision Table links graph and software ) , generating a corresponding test case node in the graph (De, Figure 10, #200, #201 to #202, Software analysis to Graph to Decision table) ; and for each test case: applying said test case to test one or more software components (De, Figure 10, #204, Apply Test Cases) ; collecting data reflecting application of said test case (De, Figure 10, #205, Run Test Cases collect information) ; and updating the graph with edges coupling said corresponding test case node to one or more (De, Figure 10, #205, Runs the test cases and Figure 4, # #53, Test Program Synthesis) component nodes corresponding to software components tested by the test case (De, Figure 10, - Iterative Process using results of #206 also see Figure 4, #34 – feedback from heuristics).

**Claim 6**

The method of claim 1, wherein the method further comprises, for each test case: updating said corresponding test case node with said data. See the rejection for claim 1.

**Claim 7**

The method of claim 1, wherein the method further comprises, for each test case: updating each said corresponding component node with said data. See the rejection for claim 1.

**Claim 8**

The method of claim 1, wherein the method further comprises, for each test case: marking the one or more software components. (De, Figure 2, 29 to 31, In the broadest reasonable interpretation to note a test result a form of marking must occur).

**Claim 9**

The method of claim 8, wherein the method further comprises, for each test case, prior to said marking: unmarking a software component marked during application of a previous test case. (De, Figure 7, #110, ability to manually edit the test plan (add and delete).

**Claim 10**

The method of claim 8, wherein said marking comprises: marking an instruction executed during application of said test case. See the rejection for claim 9.

**Claim 11**

The method of claim 8, wherein said marking comprises: marking a software component testing during application of said test case. See the rejection for claim 8.

**Claim 12**

The method of claim 8, wherein said marking comprises: marking a component module executed during application of said test case. See the rejection for claim 8 and Figure 2, #31 – required to be able to produce a report with the results,

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**Claim 18**

A computer readable medium containing a data structure configured for mapping software components to test cases configured to test the software components, the data structure comprising: a set of component nodes, each said component node corresponding to a software component; a set of test case nodes, each said test case node corresponding to a test case configured to test one or more software components; and edges coupling each said test case node to the component nodes corresponding to the software components tested by said corresponding test case. See the rejection for claim 1.

**Claim 13**

The method of claim 8, wherein said marking comprises: marking a component function executed during application of said test case. See the rejection for claim 9.

**Claim 14**

The method of claim 1, wherein said data identify one or more instructions of a software component executed during application of said test case. See the rejection for claim 9.

**Claim 15**

The method of claim 1, wherein said data identify one or more modules of a software component executed during application of said test case. See the rejection for claim 9.

**Claim 16**

The method of claim 1, further comprising: using said graph to identify one or more test cases configured to test a selected software component. See the rejection for claim 9.

**Claim 20**

The computer readable medium of claim 18, wherein each said edge coupling a test case node and a component node has an associated rating configured to reflect how completely the corresponding test case covers the corresponding software component. See the rejection for claim 2.

**Claim 23**

A computer system for testing software, the computer system comprising: a set of software components; a set of test cases configured to test the software components; a testing tool configured to apply each test case in the set of test cases against a subset of the set of software components; and a graph engine configured to generate a graph comprising: component nodes corresponding to the software component; test case nodes corresponding to the test cases; and edges coupling each test case node to component nodes corresponding to software components tested by the corresponding test case. See the rejection for claim 1.

**Claim 24**

The computer system of claim 23, further comprising: a processor configured to generate, for each software component tested by a test case, a rating indicating how completely the test case covers the software component. See the rejection for claim 2.

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**Claim 30**

The computer system of claim 23, wherein said testing tool is configured to: mark a first software component when it is tested by a first test case. See the rejection for claim 8.

**Claim 31**

The computer system of claim 30, wherein said testing tool is further configured to, prior to said marking: un-mark the first software component to remove a marking made during testing of the first software component by a second test case. See the rejection for claim 9.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2 – 5 and 17 , 19, 21-22 and 25 - 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Long as per above in view of USPN # 6,804,634 B1 Holzman (H) et al filed February 17, 2000.

**Motivation to Combine**

De teaches a software testing of building test cases and altering them and Holzman explicitly teaches details on coverage. Therefore, it would have been obvious to one of ordinary skill in the art to combine De and H because the ability to understand how much software has been tested assists in determining the reliability of a product.

**Claim 2**

The method of claim 1, further comprising: for each software component tested by a test case, calculating a coverage rating configured to indicate how completely said test case covers said software component. (H, col 2, lines 35 to col 3, line 10 and col 6, line 36 – col 7, line 5).

**Claim 3**

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The method of claim 2, further comprising: associating said coverage rating with the edge coupling the test case node corresponding to said test case to the component node corresponding to said software component. (De, Figure 10, #201, Build Graph and the rejection for claim 2);

**Claim 4**

The method of claim 2, further comprising: associating said coverage rating with the test case node corresponding to said test case. See the rejection for claim 2.

**Claim 5**

The method of claim 2, further comprising: associating said coverage rating with the component node corresponding to said software component. See the rejection for claim 2.

**Claim 17**

A computer readable medium storing instructions that, when executed by a computer, cause the computer to perform a method of mapping software components to test cases that test the software components, the method comprising: for each component in a set of software components, generating a corresponding component node in a bipartite graph; for each test case in a set of test cases configured to test the software components, generating a corresponding test case node in the graph; and for each test case: applying said test case to test one or more software components; collecting data reflecting application of said test case; and updating the graph with edges coupling said corresponding test case node and one or more component nodes corresponding to software components tested by the test case. See the rejection for claims 1,2,3,4 and 5.

**Claim 19**

The computer readable medium of claim 18, further comprising: for each software component tested by a test case, a rating configured to indicate how effectively the software component is tested. See the rejection for claim 2.

**NOTE:** Examiner believes this claim currently under 112 second rejection needs some clarity on “effectively” in terms of wording on how it is accomplished. The concept appears sound.

**Claim 21**

The computer readable medium of claim 18, wherein each said edge is configured to identify one or more of: a hardware configuration for executing said corresponding test case to test the corresponding software components; and a software configuration for executing said corresponding test case to test the corresponding software components. See the rejection for claim 2.

**Claim 22**

The computer readable medium of claim 18, wherein each said edge is configured to indicate an amount of time needed to execute said corresponding test case. See the rejection for claim 2 and H, Abstract.

**Claim 25**

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The computer system of claim 23, wherein each component node: identifies one or more test cases configured to test the corresponding software component. See the rejection for claim 3.

**Claim 26**

The computer system of claim 23, wherein each test case node: identifies one or more software components tested by the corresponding test case. See the rejection for claim 19.

**Claim 27**

The computer system of claim 23, wherein each edge coupling a test case node and a component node has an associated rating configured to indicate how effectively the corresponding test case covers the corresponding software component. See the rejection for claim 4.

**Claim 28**

The computer system of claim 23, wherein each edge coupling a test case node and a component node: identifies one or more of a hardware configuration and a software configuration for testing the corresponding component with the corresponding test case. See the rejection for claim 21.

**Claim 29**

The computer system of claim 23, wherein each edge coupling a test case node and a component node: identifies an amount of time needed to test the corresponding component with the corresponding test case. See the rejection for claim 22.

***Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Todd Ingberg whose telephone number is (571) 272-3723. The examiner can normally be reached on during the work week..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lewis Bullock can be reached on (571) 272-3759. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Todd Ingberg/  
Primary Examiner

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